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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/821,589

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Yosuke Hosoya

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07/06/2010

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EXAMINER

CANTELMO, GREGG

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

07/06/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/821,589

**Applicant(s)**

HOSOYA ET AL.

**Examiner**

Gregg Cantelmo

**Art Unit**

1795

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 June 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3, 5 and 6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5, 6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/22)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

**DETAILED ACTION**

***Response to Amendment***

1. In response to the amendment received June 22, 2010:
  - a. Claims 1, 3 and 5-6 are pending;
  - b. The prior art rejections of record stand.

***Claim Rejections - 35 USC § 103***

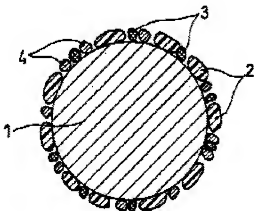
The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '643 in view of either U.S. Patent Application Publication No. 2005/0153205 (Hisashi), U.S. Patent Application Publication No. 2004/0058245 (Fujimoto), U.S. Patent Application Publication No. 2002/0136955 (Park) or JP 2001-015101 (JP '101) and either U.S. Patent No. 4,668,594 (Yamaura); U.S. Patent No. 5,958,281 (Takada) or U.S. Patent No. 6,475,663 (Mohwald).

JP '643 discloses a positive active material comprising: particles of a compound oxide of lithium and a transition metal 1 (figures and paragraphs 10 and 24) having an inherent layered structure thereby permitting the intercalation/deintercalation of lithium during charging/discharging and a coating layer on the active material 1 wherein the coating layer comprises an inorganic lithium compound 4 (paragraphs 10 and 23) and a carbonaceous conductive material 3 (paragraph 10 and 23 as applied to claim 1). The inorganic compound 4 is a lithium compound (paragraph 23 as applied to claim 1). The weight ratio of the particles 1 to the coating 2/3/4 teaches of particle weights of 10

grams relative to about 1 gram of coating material (see examples for weight ratios). Thus JP '643 teaches that the weight ratio of the particles will clearly be at least 70% but less than 98% relative to the coating layer 2/3/4 (as applied to claim 1). The positive active material can be a variety of metal oxides including lithium nickel manganese oxide (para. 24 as applied to claim 1).

The coating layer with the inorganic filler 4 and carbonaceous material 3 substantially covers the entire surface of the base particle 1 as shown in Fig. 1).



JP '643 does not teach that the product is a mechanofused coating (claim 1) or of the inorganic material being either lithium iron phosphate or lithium phosphate (claim 1).

Mechanofusion processes for coating active materials does not represent a novel contribution to the art and such process modifications would have been well within the skill of the ordinary worker in the art.

Hisashi teaches of using mechanofusion to apply a shell coating to an active material particle (para. 46). Fujimoto also recognized the use of mechanofusion systems for fabricating active material in batteries (paras. 19, 21, 24, 25). JP '151

recognized the use of a mechanofusion process to coat a core active particle used as an active material in a battery (abstract and Figs. 1-3). Park also recognized the use of mechanofusion systems for fabricating active material in batteries (fig. 10 and para. 35).

Mechanofusing a surface coating onto a base particle for active materials is well recognized in the art by at least the teachings of Hisashi, Fujimoto, JP '151 and Park and would have provided a variety of recognized benefits. In the process, particles are introduced into a mechanofusion system such as that shown in Fig. 10 of Park.

Particles are then trapped between the wall and a rotating inner head; the shearing force the particles experience in this gap causes them to fuse together. The resulting partially fused (coated) particles are constantly recycled to obtain uniform surface coverage. When used for encapsulating electroactive particles the process encourages the formation of encapsulated electroactive particles having improved adhesion between the coating and the base and also a more uniform aspect ratio, as the shearing force also smoothes the finished particles.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '643 by forming the coating on the core particles using a mechanofusion process as suggested by either Hisashi, Fujimoto, JP '151 or Park since it would have provided a shell having improved adhesion between the core and the coating.

As to the inorganic material being either lithium iron phosphate or lithium phosphate:

Essentially JP '643 teaches of coating lithium metal oxide base particles with a mixture of an inorganic conducting material and an electron conducting material.

While the inorganic conducting materials taught by JP '643 are not inclusive of either lithium iron phosphate or lithium phosphate, JP '643 does teach that the inorganic material is a lithium ion conductive inorganic solid electrolyte material (see abstract). Thus one of ordinary skill in the art would have reasonably appreciated that the inorganic material coated on the positive electrode active material could reasonably be any known teach that the inorganic material is a lithium ion with a reasonable expectation that any such combination would effectively operate in the desired manner taught by JP '643, absent clear evidence to the contrary.

Each of lithium iron phosphate and lithium phosphate are art recognized ion conductive materials used in lithium secondary batteries as shown by either Yamaura (col. 5, ll. 33-37); Takada (col. 1, ll. 32-55); or Mohwald (col. 4, ll. 43-65). Thus it would have been apparent to one of ordinary skill in the art to use either lithium iron phosphate or lithium phosphate as an alternative ion conducting inorganic material coated onto the positive electrode since the primary reference teaches that it is generally known to coat lithium metal oxide base particles with a mixture of a lithium ion conducting inorganic material and an electron conducting material and since the specific inorganic materials of lithium iron phosphate and lithium phosphate are art recognized ion conductive materials used in lithium secondary batteries as shown by either Yamaura, Takada, or Mohwald.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '643 by selecting the lithium ion conducting inorganic material to be either lithium iron phosphate or lithium phosphate since such materials are art recognized lithium ion conducting inorganic materials as shown by either Yamaura, Takada, or Mohwald and one of ordinary skill in the art would have found such a modification to have provided the predictable result of providing a coating to the positive active material having both the requisite electron conducting and lithium ion conducting properties. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '643 in view of either Hisashi, Fujimoto, JP '151 or Park as applied to claim 1 above.

The difference between claim 3 and JP '643 is that JP '643 does not teach of the weight ratio between the inorganic material to the carbonaceous material being between 99:1 and 60:40.

While JP '643 discloses providing both an inorganic component 4 and carbon component 3 in a coating material to a positive active material 1, the disclosure does not specifically teach of the ratio of these two materials, however it is clear that there is an inherent ratio between these two components.

Varying the amount of each of components 2, 3 and 4 of the coating layer are recognizable optimizable components. One of ordinary skill in the art would have recognized that by varying the amount of carbon in the film, the electronic conductivity of film would vary accordingly. One of ordinary skill in the art would have also recognized that by varying the amount of the inorganic lithium compound in the film, the ionic conductivity of the film would vary accordingly. Adjusting the ratios of both materials will optimize the ionic and electronic conductivity of the film and selection of the claimed ratio would have been obvious to one of ordinary skill in the art since it would have provided a coating which exhibited optimal ionic and electronic conductivities.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '643 by adjusting the ratios of both the carbon component and inorganic component of the film of JP '643 within the ratio defined in claim 3 since the optimization of these would have been a recognized result-effective variable which could have been optimized since it would have provided a coating which exhibited optimal ionic and electronic conductivities. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima

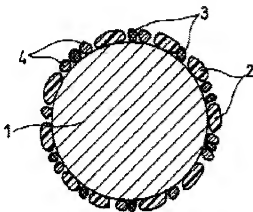


facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

4. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '643 in view of either Hisashi, Fujimoto, JP '151 or Park and further in view of either U.S. Patent No. 4,668,594 (Yamaura); U.S. Patent No. 5,958,281 (Takada) or U.S. Patent No. 6,475,663 (Mohwald).

JP '643 discloses a positive active material comprising: particles of a compound oxide of lithium and a transition metal 1 (figures and paragraphs 10 and 24) having an inherent layered structure thereby permitting the intercalation/deintercalation of lithium during charging/discharging and a coating layer on the active material 1 wherein the coating layer comprises an inorganic lithium compound 4 (paragraphs 10 and 23) and a carbonaceous conductive material 3 (paragraph 10 and 23 as applied to claim 5). The inorganic compound 4 is a lithium compound (paragraph 23 as applied to claim 5). The weight ratio of the particles 1 to the coating 2/3/4 teaches of particle weights of 10 grams relative to about 1 gram of coating material (see examples for weight ratios). Thus JP '643 teaches that the weight ratio of the particles will clearly be at least 70% but less than 98% relative to the coating layer 2/3/4 (as applied to claim 5).

The coating layer with the inorganic filler 4 and carbonaceous material 3 substantially covers the entire surface of the base particle 1 as shown in Fig. 1).



JP '643 discloses a nonaqueous secondary battery comprising: a negative active material and a positive active material comprising: particles of a compound oxide of lithium and a transition metal 1 (figures and paragraphs 10 and 24) having an inherent layered structure thereby permitting the intercalation/deintercalation of lithium during charging/discharging and a coating layer on the active material 1 wherein the coating layer comprises an inorganic lithium compound 4 (paragraphs 10 and 23) and a carbonaceous conductive material 3 (paragraph 10 and 23 as applied to claim 5).

The positive active material can be a variety of metal oxides including lithium nickel manganese oxide (para. 24 as applied to claim 5).

JP '643 does not specify that the inorganic material is either lithium iron phosphate or lithium phosphate (claim 5) or the weight ratio between the inorganic material to the carbonaceous material being between 99:1 and 60:40 (claim 6).

Regarding the inorganic material being either lithium iron phosphate or lithium phosphate (claim 5):

Essentially JP '643 teaches of coating lithium metal oxide base particles with a mixture of an inorganic conducting material and an electron conducting material.

While the inorganic conducting materials taught by JP '643 are not inclusive of either lithium iron phosphate or lithium phosphate, JP '643 does teach that the inorganic material is a lithium ion conductive inorganic solid electrolyte material (see abstract). Thus one of ordinary skill in the art would have reasonably appreciated that the inorganic material coated on the positive electrode active material could reasonably be any known teach that the inorganic material is a lithium ion with a reasonable expectation that any such combination would effectively operate in the desired manner taught by JP '643, absent clear evidence to the contrary.

Each of lithium iron phosphate and lithium phosphate are art recognized ion conductive materials used in lithium secondary batteries as shown by either Yamaura (col. 5, ll. 33-37); Takada (col. 1, ll. 32-55); or Mohwald (col. 4, ll. 43-65). Thus it would have been apparent to one of ordinary skill in the art to use either lithium iron phosphate or lithium phosphate as an alternative ion conducting inorganic material coated onto the positive electrode since the primary reference teaches that it is generally known to coat lithium metal oxide base particles with a mixture of a lithium ion conducting inorganic material and an electron conducting material and since the specific inorganic materials of lithium iron phosphate and lithium phosphate are art recognized ion conductive materials used in lithium secondary batteries as shown by either Yamaura, Takada, or Mohwald.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '643 by selecting the lithium ion conducting inorganic material to be either lithium iron phosphate or lithium phosphate since such materials are art recognized lithium ion conducting inorganic materials as shown by either Yamaura, Takada, or Mohwald and one of ordinary skill in the art would have found such a modification to have provided the predictable result of providing a coating to the positive active material having both the requisite electron conducting and lithium ion conducting properties. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

Regarding the weight ratio between the inorganic material to the carbonaceous material being between 99:1 and 60:40 (claim 6):

While JP '643 discloses providing both an inorganic component 4 and carbon component 3 in a coating material to a positive active material 1, the disclosure does not specifically teach of the ratio of these two materials, however it is clear that there is an inherent ratio between these two components.

Varying the amount of each of components 2, 3 and 4 of the coating layer are recognizable optimizable components. One of ordinary skill in the art would have recognized that by varying the amount of carbon in the film, the electronic conductivity of film would vary accordingly. One of ordinary skill in the art would have also

recognized that by varying the amount of the inorganic lithium compound in the film, the ionic conductivity of the film would vary accordingly. Adjusting the ratios of both materials will optimize the ionic and electronic conductivity of the film and selection of the claimed ratio would have been obvious to one of ordinary skill in the art since it would have provided a coating which exhibited optimal ionic and electronic conductivities.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '643 by adjusting the ratios of both the carbon component and inorganic component of the film of JP '643 within the ratio defined in claim 6 since the optimization of these would have been a recognized result-effective variable which could have been optimized since it would have provided a coating which exhibited optimal ionic and electronic conductivities. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

Regarding the product-by-process feature of mechanofusing the coating to the core:

Hisashi teaches of using mechanofusion to apply a shell coating to an active material particle (para. 46). Fujimoto also recognized the use of mechanofusion systems for fabricating active material in batteries (paras. 19, 21, 24, 25). JP '151 recognized the use of a mechanofusion process to coat a core active particle used as an active material in a battery (abstract and Figs. 1-3). Park also recognized the use of mechanofusion systems for fabricating active material in batteries (fig. 10 and para. 35).

Mechanofusing a surface coating onto a base particle for active materials is well recognized in the art by at least the teachings of Hisashi, Fujimoto, JP '151 and Park and would have provided a variety of recognized benefits. In the process, particles are introduced into a mechanofusion system such as that shown in Fig. 10 of Park. Particles are then trapped between the wall and a rotating inner head; the shearing force the particles experience in this gap causes them to fuse together. The resulting partially fused (coated) particles are constantly recycled to obtain uniform surface coverage. When used for encapsulating electroactive particles the process encourages the formation of encapsulated electroactive particles having improved adhesion between the coating and the base and also a more uniform aspect ratio, as the shearing force also smoothes the finished particles.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '643 by forming the coating on the core particles using a mechanofusion process as suggested by either

Hisashi, Fujimoto, JP '151 or Park since it would have provided a shell having improved adhesion between the core and the coating.

***Response to Arguments***

5. Applicant's arguments filed June 22, 2010 have been fully considered but they are not persuasive.

Applicant states, as recited on page 4 of the specification, that a compound of lithium and a transition metal does not lead to improved electron conductivity and may decrease electron conductivity.

This argument is not persuasive for the following reasons.

First the statement on page 4 of the specification is only to coating with an ion conducting material (the compound of lithium and a transition metal). One of ordinary skill in the art would readily appreciate that the mixture of an ion conductor and an electron conductor, in combination, would provide a synergistic effect of improving both the ionic and electron conductivity.

The primary reference of Nagura clearly suggests a mixture of both an ionic conductor and electron conductor coating the positive active material and the combination of both would provide both ionic and electron conductivity to the coating of the active material particles.

Second the statement is not specific that the use of known ion conductors, and  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$ , specifically would not lead to the desired ion conductivity aspect of the compound coating of Nagura.

While Applicant refers to Table 1, the evidence therein is not persuasive. First it is unclear if the reliance upon Table 1 is held to be argued as unexpected. The fact that differences are shown does not render the claimed combination patentable if the prior art reasonably teaches, suggests or renders obvious the same product and the results obtained by the prior art product would be expectedly the same.

A claimed compound may be obvious because it was suggested by, or structurally similar to, a prior art compound even though a particular benefit of the claimed compound asserted by patentee is not expressly disclosed in the prior art. It is the differences in fact in their respective properties which are determinative of nonobviousness. If the prior art compound does in fact possess a particular benefit, even though the benefit is not recognized in the prior art, applicant's recognition of the benefit is not in itself sufficient to distinguish the claimed compound from the prior art. In *re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1991). The evidence relied upon should establish "that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance." *Ex parte Gelles*, 22 USPQ2d 1318, 1319 (Bd. Pat. App. & Inter. 1992). Where the unexpected properties of a claimed invention are not shown to have significance equal to or greater than the expected properties, the evidence of unexpected properties may not be sufficient to rebut the evidence of obviousness. In *re Nolan*, 553 F.2d 1261, 1267, 193 USPQ 641, 645 (CCPA 1977).

Differences alone cannot be held to be clear showing of unexpected results unless the results shown are clearly evidenced as being unexpected. There is no law



which equates different results to unexpected results. Therefore the evidence of Table 1 is not persuasive.

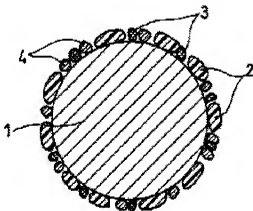
Applicant further argues that the secondary teachings of Yamaura, Takada and Mohwald while teaching of  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$  do not teach these materials as a compound of an active material or a coating.

This argument is not persuasive for the following reasons.

First, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The fact that neither Yamaura, Takada and Mohwald teach of using  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$  as an ion conductive coating fails to reasonably appreciate the combination of teachings of both Nagura in view of Yamaura, Takada and Mohwald and therefore is a piecemeal analysis of the secondary references of Yamaura, Takada and Mohwald.

Second, while Yamaura, Takada and Mohwald may not teach of  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$  as a compound of an active material or a coating, these references need not teach such given the teachings of the combination of references as the teachings of using an ion conductor as a coating element for an active material is found in the primary teachings of Nagura.

As discussed above, the coating layer of Nagura with the inorganic filler 4 and carbonaceous material 3 substantially covers the entire surface of the base particle 1 as shown in Fig. 1).



As set forth in the outstanding rejection of record and as should be apparent from the teachings of the primary reference, Nagura teaches of coating an active material with a mixture that includes both an ionic conductor and an electron conductor. While the ionic conductor materials are not expressly either  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$  such materials are well known in the art as having excellent ion conductivity as taught by the various secondary references of Yamaura, Takada and Mohwald. Therefore it would have been well within the skill of the ordinary worker in the art to substitute the ionic conductor of Nagura with either  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$  Yamaura, Takada and Mohwald since it would have provided the predictable result of providing a coating to the positive active material having both the requisite electron conducting and lithium ion conducting properties. The selection of a known material based on its suitability for its intended use

supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

As to the weight ratio, the teachings of JP '643 clearly direct one of ordinary skill in the art that the core particle constitutes substantially the majority of the weight of the combined core and shell weight of the particle. While the inorganic lithium compound may be different, one of ordinary skill in the art would have still found it obvious to maintain the weight ratio to significantly favor the active material over the shell coating. This would have further been fundamentally obvious to one of ordinary skill in the art since the ideal conditions would be to maximize the amount of the active material relative to the shell coating, thereby providing the benefits of the shell coating to the active material while maximizing the amount of material which intercalates/deintercalates lithium, i.e. the active material core particle.

Therefore the claimed weight ratios would have been obvious to one of ordinary skill in the art at the time the claimed invention was made given the teachings of JP '643 as discussed above and for reasons which would have been obvious to one of ordinary skill in the art with respect to maximizing the active material. Differences in the inorganic material provided in the shell coating would not have significantly altered the weight ratio materials outlined in JP '643 and no evidence of record has been provided to convince the Examiner otherwise.

Applicant argues that the prior art does not teach the general conditions of the claims in order for the weight ratio to be obviously optimized since the references fail to

teach of at least one of  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$  and a carbonaceous material as a coating.

The Examiner respectfully disagrees.

Nagura teaches the general conditions of providing an active material coating comprising a mixture of an ion conductor and a carbonaceous electron conductor.

The secondary references of Yamaura, Takada and Mohwald all teach that  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$  are known and efficient ion conductors in the art. As such it would have been plainly obvious to use  $\text{LiFePO}_4$  and  $\text{Li}_3\text{PO}_4$  as the ion conductor in the coating of Nagura for at least those reasons set forth above.

Reliance upon *In re Aller* and *In re Antoine* are noted however the specific fact patterns in these decisions are not identical to the fact pattern in the instant case and thus not readily applicable. Note *In re Antoine* is to a stand-alone rejection of the claims by a single reference and the optimization therein is not linearly applicable to the rationale applied to the modification of the prior art relied upon above.

Nothing in either of the case law documents cited require that the general conditions must come only from a single reference and cannot flow logically and obviously from a combination of references to arrive at the same general conditions of the claims.

Thus the prior art teaches the general conditions of the claim and optimization of the weight ration of ion conductor to electron conductor would have been further well within the skill of the ordinary worker in the art to optimize both the ionic and electron conductivity of the coating mixture on the surface of the active material particle.

Therefore the claimed invention is still held to be obviated by the prior art relied in the rejections above.

***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gregg Cantelmo/  
Primary Examiner, Art Unit 1795